Synopsis

Of

The research work leading to the Degree of

Doctor of Philosophy

in Botany

entitled

"Utilization of Wild Fruits for Development and Promotion of Value Added Products"

Submitted by

Mr. Khan Khurram Zuber Abdul Gaffar

M.Sc. B.ed, M.Phil (Botany)

Under the Guidance of

Dr. B. S. Surwase

Professor and Head

Department of Botany, School of Life Sciences,

Swami Ramanand Teerth Marathwada University Nanded

July 2019

"Utilization of Wild Fruits for Development and Promotion of Value added Products"

Introduction:-

Post harvest losses of fruits are more serious in developing country like India and total losses from harvest to consumer point are as high as 30-40%, which is worth of thousands of crore rupees. In Indian forests, there occur a wide variety of fruits. Now, India is the second largest manufacturer of fruits in world produce (Patil *et al.,* 2013). Fruits serve as an important and essential source of vitamins and minerals such as Calcium, Phosphorus, Iron and many other constituents (Kowalski *et al.,* 2013). In India, less than 2% of fruits are processed against 65% in the United States (Patil *et al.,* 2013). Therefore, there is a great scope to develop skills of local and forest dwelling communities for processing & value addition to the underutilized wild fruits into various products like Jam, Jelly, Fruit Bar and Fruit toffee.

Keeping these aspects in mind, for present study following forest based /cultivated fruits were selected to develop skills in forest dwelling and local communities in Marathwada for formulations and development of various fruit products having medicinal properties, which would promote forest based micro and small enterprises/entrepreneurships for uplifting their socioeconomic conditions.

1. *Ziziphus mauritiana* Lamk. (Rhamnaceae)

Ziziphus mauritiana (Rhamnaceae) locally known as Bor. It is a popular fruit found wild and cultivated in Marathwada. Fruits of *Ziziphus mauritiana* are used as liver tonic as an antioxidant, hepatoprotective, protective effect, weight gain and reported to have anticancer effects(Tripathi and Tripathi, 2014).

The fruits (Raw) are pickled (Non fermented) with a crude method (Uddin & Hussain, 2012). Fruits are also processed into Pickle (Fermented), Jam, Preserve and Candy and Fruit powder (Anonymous, 2004). The fruits are even processed for Candy, Juice, Chutney, Murrumba, Pickle, and Powder (Chavan and Patil, 2013). However, the fruits

can be processed for non-fermented Pickle (Raw fruits), Dry Fruit Pickle, Jelly, Mix Jam, Ber fruit bars and toffee and Ber squash .

***Ficus racemosa* Linn. (Moraceae)**

The plant is large deciduous tree distributed all over Marathwada both wild or cultivated. Its fruits are eaten by villages. It is known as Cluster fig in English & Umbar in Marathi. Fruits are popular in indigenous system of medicine and have hypocholesterolemic, antidiabetic, antiulcer and antifilarial properties (Paarakh, 2009 and Mishra *et al.,* 2010). Although, Jam and powder has been extracted from its fruits (Chavan and Patil, 2013), the ripe fruits are not processed for Jelly, Fruit bar and toffee.

Review of Literature:

Jams

Literature on Jam processing reveals that Jam has been successfully produced from forest based fruits like *Carissa carandus* (Wani *et al.,* 2013); *Ziziphus jujuba* (Uddin and Hussain, 2012; Anonymous, 2004); Umber (Chavan and Patil, 2013) and *Syzygium cumini* (Chaudhary and Mukhopadhyay , 2012). Apart from this, agriculture based Mango ,Papaya, Watermelon, Guava and Strawberry etc are successfully processed for Jams.

Fruit Jelly

Literature on Jelly processing reveals that Jelly has been successfully produced from forest based fruits like *Ziziphus jujuba* (Crude Jelly-Uddin and Hussain, 2012) ; *Syzygium cumini* (Chaudhary and Mukhopadhyay, 2012); *Embilica officinalis* (Shekhawat *et al.,* 2014 and Ravani and Joshi, 2014); Wood apple (Chavan and Patil, 2013); and *Phoenix dactyli* (Benali *et al.,* 2014)

Fruit Toffees

Fruits have been successfully processed for fruit Toffees like *Syzygium cumini* (Chavan and Patil, 2013); Anola (Ravani and Joshi, 2014); *Borassus flabellifer* (Chakraborti *et al.,*

2011); Fig and Guava (Kohinkar *et al.,* 2014);Carrot (Chavan and Patil, 2013); Strawberry (Chavan and Patil, 2013) and Fig /Mango (Sakhale *et al.,* 2012).

Apart from this, agriculture based Mango (Min and Nath, 1993; Azeredo *et al.,* 2006), Papaya, Guava etc are successfully processed for fruit Toffee.

Objectives of Research/ Proposed hypothesis:

a. Standardization of fruit processing methods like Jam, Jelly, bar and toffee form Ber fruits in compliance with the new food law in force of Food Safety and Standards Authority of India.
b. Standardization of Umber fruit processing methods for toffee and Jelly in compliance with the new food law in force of Food Safety and Standards Authority of India.
c. Physicochemical properties and sensory evaluation of value added products.
d. Standardization of nutritional values and shelf life of value added products.
e. To conduct Business Development Strategies for the standardized products including value addition.
f. Promotion of standardized items based micro and small Enterprises in Marthwada by means of interactions, presentations, providing protocols and other information.

Material and Methods:-

A. Fruit Product development:

Fruit Jam: -Ripened, graded, selected, washed and destoned fruits would be cut into pieces. Boil pieces in water if required and course filter to get pulp. Add sugar and citric acid. Heat mixture until sugar content is 68%. Add preservative when hot and pack.

Fruit Jelly: - Fruit juice is extracted and filtered. Add sugar and mixture is boiled. Add pectin, citric acid and color and KMS in the required quantity. Boiling is done till jelly is obtained.

Fruit toffee:- Fruit pulp is extracted and cooked .Other gradients like sugar, essences, color , glucose ,fat, Maida, milk powder etc are added as per requirement and thoroughly mixed and cooked. The TSS should be 80 to 85 ^{0}Brix and check its check point with the help of drop test. The cooled mass is then transferred to smooth surface pre-smeared with fat and flavoring material is added. Finally the entire mass is spread into a thin sheet and allowed to cool to set for 2 hour. These are cut with the help of toffee cutter. These are wrapped in butter paper and metallic coated polythene wrapper.

The products developed under this project shall be safe for human consumption in compliance with the new food law in force of Food Safety and Standards Authority of India.

B. Physicochemical and sensory evaluation of value added products will be done as per methods suggested by Sharma *et al.,* 2011.

C. Nutritional values would be done as per methods suggested in Practical Methods in Biochemistry by Plummer and Phyto-chemical analysis by Wagner.

Significance of proposed work:-

1. This would standardized fruit processing methods like Jam, Jelly, Fruit bar and Toffee.
2. The standardized methods would be useful to many Biotechnological units for manufacturing of standardized products.
3. This would empower Local and Forest dwelling communities and Forest Department to undertake micro and small enterprises in Marthwada.
4. The results would also be useful to Tribal Development Corporation for overall development of tribal communities.
5. It would be useful for Gov. of Maharashtra and NGOs involved in overall development of rural communities of Nanded region of the state.

6. The developed enterprises can be replicated in rest part of Maharashtra and then throughout India

1. Proposed work plan / Formulation and structure of study :

I year :

1. Literature survey of proposed work plan.
2. Collection and preservation of fruits.
3. Standardization of Ber fruit and Umber fruits processing methods for and toffee and Jelly.
4. Physicochemical evaluation of value added products.
5. sensory evaluation of value added products
6. Determination of Nutritional values and shelf life of all above value added products.

II year :

1. Standardization of Ber fruit processing methods for Mixed Jam and bar.
2. Physicochemical evaluation of value added products.
3. sensory evaluation of value added products
4. Determination of Nutritional values and shelf life of all above value added products.

III year:

1. Promotion of Standardized items based micro and Small enterprises in Marthwada.
2. Thesis writing and Compilation of data.

References:-

1. Anonymous (2004) Technical manual for small-scale fruit processors, International Centre for Underutilized Crops, United Kingdom.
2. Azeredo, H. M. C., Brito, E. S., Moreira, G. E. G., Farias, V. L. & Bruno, L. M. (2006) Effect of drying and storage time on the physico-chemical properties of Mango Leathers, *International Journal of Food Science and Technology*, 41(6): 635-638.
3. Chaudhary, B. and Mukhopadhyay, K. (2012) *Syzygium cumini* L. Skeels: A potential source of nutraceuticals, *Int. J. of Pharm and Bio. Sci.*,2(1): 46-53.
4. Chavan, U. D. and Patil, J. V. (2013) Industrial processing of fruits and vegetables, Daya Publishing House, A division of Astral Int Pvt Ltd , New Delhi.
5. Gopakumar, A. S. and Kavita, M. S. (2014) Processing and preservation qualities of value added products based on *Garcinia cambogia* [Malabar Tamarind], *IOSR-JESTFT*, 8(1):1-9.
6. Jain, P. and Sharma, H. P. (2013) A potential ethnomedicinal plant: *Semecarpus anacardium* Linn.-A review, *Int. J. of Research in Pharmacy and Chemistry,* 3(3):564-559.
7. Joshi P and Jain S. 2006. Chemical composition and product development from Karonda Carissa carandas L. *Indian food Packer* 60(4):66-72.
8. Kohinkar, S. N., Chavan, U. D., Pawar, V. D. and Amarowicz, R. (2014) Studies on preparation of mixed fruit toffee from Fig and Guava fruits, *J Food Sci Technol,* 51(9):2204-2209.
9. Kumar.P.S., Srivastava.A., Bishnoi.S.K. (2017) Value addition in under-exploited fruits of Karonda (*Carissa carandus* L.) : an earning opportunity for rural communities in India. *Rashtriya Krishi* Vol. 12 (2)
10. Min, M. A. and Nath, N. (1993) Storage changes in fortified mango bars, *J. of Food Sci and Tech,* 30(4):279-282.
11. Offia-Olua, B.I. and Ekwunife, O.A. (2015) Production and evaluation of the physic-chemical and sensory qualities of mixed fruit leather and cakes produced

from apple(*Musa pumila*), banana (*Musa sapientum*), pineapple (*Ananas comosus*), *Science Direct-Nigerian Food Journal,* 33:22-28.

12. Patil, M. M., Kalse, S.B. and Sawant, A. A. (2013) Preparation of guava jam blended with sapota, *Agric Eng. Int. CIGR Journal,15(1):167-172.*
13. Sakhale, B. K., Chalwad, R. U. and Pawar, V. D. (2012) Standardization of process for preparation of fig-mango mixed toffee, *International Food Research Journal*, 19(3): 889-891.
14. Sharma, R., Joshi, V. K. and Rana, J. C. (2011) Nutritional composition and processed products of Quince (*Cydonia oblonga Mill.*),*Indian Journal of Natural Products and Resources,* 2(3):354-357.
15. Shekhawat, S., Rathore, N. S. and Kaushik, R. A. (2014) Advances in processing and product development of Aonla (*Emblica officinalis*) in Indian context-A review. *Int. J. of Food and Nutritional Sciences,* 3(6): 242-247.
16. Tripathi, P. and Tripathi, S. (2014) *Ziziphus jujuba*: Phytopharmacological review. *Int. J. Res. Dev. Pharm Sci.*, 3(3): 959-966.
17. Uddin, M. and Hussain, I. (2012) Development of diversified technology for *Jujube (Ziziphus jujuba* L.*)* processing and preservation, *World J. Dairy and Food Sci.,* 7(1):74-78.
18. Wani, R. A., Prasad, V. M., Hakeem, S. A., Sheema S., Angchuk, S. and Dixit, A. (2013) Shelf life of Karonda jams (*Carissa carandas* L.) under ambient temperature, *African Journal of Agriculture Research,* 8 (21): 2447-2449.
19. Winton AL. 2001. Techniques of Food Analysis. Agrobios (India). 110-112.

Signature of Candidate **Signature of research supervisor**

Khan Khurram Zuber **Dr.B.S.Surwase**